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is either vertical or horizontal;

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an image converting unit converting the character image extracted by said character image extracting unit by rotating the character image, and
5 /or by flipping the character image to a mirror image, and

15 it is detected whether or not to require the rotation, the rotational angle if the rotation is required, and the mirror image flipping, which are intended for correcting the extracted character image to be properly orientated, based on a result of the recognition performed by said character recognizing unit.

25 a language identifying unit identifying a
language of the input document image, wherein
the input document image is corrected to be a

properly orientated image in correspondence with a result of identification made by said language identifying unit.

5 4. The document image correcting device according to claim 1, wherein

 said character image extracting unit selects and extracts a character image a black pixel ratio of which is within a predetermined range.

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 5. The document image correcting device according to claim 1, wherein

 said character image extracting unit selects and extracts a character image a ratio of a long side to a short side of which is within a predetermined range.

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 6. The document image correcting device according to claim 2, wherein

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 said character orientation detecting unit detects as a properly orientated character image an image having a highest degree of likelihood of the recognition performed by said character recognizing unit among the images to which said image converting unit converts the extracted character image with

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has a highest degree of likelihood of the recognition performed by said character recognizing unit, and a character code which correspond to the image and is not predetermined, among the images to which said image converting unit converts the extracted image with different conversion methods, and detects whether or not to require the rotation, the rotational angle from the properly orientated image to the input image if the rotation is required, and the mirror image flipping.

9. A document image correcting device correcting an input document image to be a properly orientated image, comprising:

a line orientation determining unit determining whether a line orientation of an input document image is either vertical or horizontal;

a line image extracting unit extracting a whole or a part of a line from the input document image as a line image;

a character orientation detecting unit detecting whether or not to require a rotation, a rotational angle if the rotation is required, and mirror image flipping, which are intended for correcting a character image within the line image extracted by

said line image extracting unit, in correspondence with a result of a determination made by said line orientation determining unit; and

5 a document image correcting unit correcting the input document image to be a properly orientated image based on a result of detection made by said character orientation detecting unit.

10 10. The document image correcting device according to claim 9, wherein:

said character orientation detecting unit further comprises

15 an image converting unit rotating the character image within the line image extracted by said line image extracting unit, and/or flipping the character image to a mirror image in correspondence with a result of a determination made by said line orientation determining unit, and

20 a character recognizing unit performing character recognition for the character image converted by said image converting unit, and outputting a character code corresponding to each character image within the line image, and a degree of likelihood of the recognition; and

25 it is detected whether or not to require the

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12. The document image correcting device
according to claim 10, wherein

13. The character image correcting device according to claim 10, wherein

20 said character orientation detecting unit
detects only one image type as a properly orientated
image if there is the only one image type having a
predetermined or higher mean degree of likelihood of
the recognition performed by said character
25 recognizing unit for the character image within the

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5 a document image correcting unit correcting the
input document image to be a properly orientated
document image based on a result of detection made by
said character orientation detecting unit.

determining whether a line orientation of the
input document image is either vertical or
horizontal;

correcting the input document image to be a properly orientated document image based on a result of detection.

25 16. A computer-readable storage medium for use

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character image extracting means for extracting

a character image from the input document image;

character orientation detecting means for
detecting whether or not to require a rotation, a
rotational angle if the rotation is required, and
5 mirror image flipping, which are intended for
correcting the character image extracted by said
character image extracting means to be properly
orientated, in correspondence with a result of a
determination made by said line orientation
10 determining means; and

document image correcting means for correcting
the input document image to be a properly orientated
document image based on a result of detection made by
said character orientation detecting means.

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